♦EPA # Project Summary

Investigation of Ammonia Equipment Configurations for Supermarket Applications

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The report gives results of a study that provided information regarding the merits of using ammonia with a secondary brine loop for supermarket refrigeration systems. The ammonia systems were compared with an equivalent R-22 system. The models used in the study are provided with the final report.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

The Program

The objectives of this project were to quantify the advantages and disadvantages of using ammonia with a secondary brine refrigerant compared to R-22 in supermarket refrigeration applications. These objectives were achieved by numerical experiments using simulations. Mechanistic models of refrigeration system compo- nents were used, based on fundamental principles, accepted heat transfer/pressure drop correlations, and available manufacturers' data. Available thermodynamic and transport property data correlations for ammonia and R-22 were used in the models. The parameters of these models were varied to determine their effect on system performance and locate optimum values. A modular approach was used in which each component was separately modeled allowing simple changes in system configurations.

The combined component models resulted in a large set of coupled nonlinear algebraic equations for the quasi-steady systems that did not involve brine storage. The systems involved differential and algebraic equations. These equations were solved using the general-purpose simulation programs EES and TRNSYS. EES is a robust nonlinear equation-solving program with built-in thermophysical property data. TRNSYS is a sequential modular simulation program that employs schemes to solve coupled algebraic and differential equations.

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The complete report and diskette, entitled "Investigation of Ammonia Equipment Configurations for Supermarket Applications," (Order No. PB95-502555; Cost: $90.00, subject to change) will be available only from:
> *National Technical Information Service*
> *5285 Port Royal Road*
> *Springfield, VA 22161*
> *Telephone: 703-487-4650*

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